diminishing the effect of the diurnal change in temperature. Of the highs three appeared off the Pacific coast, two to the north of Montana, and three in Manitoba or the Lake Superior region. Five of these were traced to the south Atlantic coast, two to Newfoundland, and one disappeared in Illinois.

Lows.—Of the lows, five were first seen near Montana, three in the central Plateau region, and two in the lower Missouri Valley. Six of the storms could be followed to Newfoundland, two were last noticed off the middle Atlantic coast, and one died out in the central Gulf States. As low No. I moved into the Atlantic Ocean a northeast wind of 52 miles an hour occurred at Block Island, p. m. of 4th. As low No. VIII reached the upper Lake region, evening of the 25th, a west wind of 48 miles an hour was caused at Cleveland. The same afternoon Parkersburg experienced a thunderstorm with west wind of 52 miles, and Pittsburg the same kind of wind of 48 miles from the northwest.—*H. A. Hazen, Professor.*

Movements of centers of areas of high and low pressure.

Number.	First observed.			Last observed.			Path.		Average velocities.	
	Date.	Lat. N.	Long. W.	Date.	Lat. N.	Long W.	Length.	Duration.	Daily.	Hourly.
High areas.		°	°		°	°	*Miles.*	*Days.*	*Miles.*	*Miles.*
I	*28, a. m.	37	124	1, p. m.	32	78	3,240	4.5	720	30.0
II	1, p. m.	52	96	3, p. m.	49	60	1,740	2.0	870	36.2
III	1, p. m.	37	123	11, a. m.	32	78	5,490	9.5	578	24.1
IV	5, a, m.	50	84	9, a. m.	34	76	1,500	4.0	375	15.6
V	12, p. m.	52	115	19, p. m.	48	54	3,780	7.0	546	22.5
VI	17, a. m.	50	107	20, a. m.	39	88	1,500	3.0	500	20.8
VII	20, a. m.	49	93	25, p. m.	27	79	2,370	5.5	431	18.0
VIII	23, a. m.	42	127	30, p. m.	33	75	4,300	7.5	560	23.3
Total							23,820	43.0	4,574	
Mean of 8 paths							2,977		572	23.8
Mean of 43 days									554	23.1
Low areas.										
I	*29, a. m.	54	116	3, a. m.	41	69	2,520	5.0	504	21.0
II	1, p. m.	42	112	5, p. m.	31	88	2,550	4.0	637	26.5
III	6, p. m.	54	113	10, a. m.	48	55	2,730	3.5	780	32.5
IV	8, p. m.	36	99	12, a. m.	48	78	1,470	3.5	420	17.5
V	10, a. m.	47	120	15, p. m.	47	55	3,060	5.5	556	23.2
VI	14, p. m.	51	118	21, a. m.	50	58	3,450	6.5	531	22.1
VII	21, p. m.	41	110	26, a. m.	49	56	2,640	4.5	587	24.5
VIII	24, p. m.	46	94	27, a. m.	46	55	1,830	2.5	732	30.5
IX	25, a. m.	41	104	29, p. m.	44	69	2,550	4.5	567	23.6
X	26, p. m.	53	118	†1, p. m.	48	58	2,640	5.0	528	22.0
Total							25,440	44.5	5,842	
Mean of 10 paths							2,544		584	24.3
Mean of 44.5 days									572	23.8

*May. †July.

RIVERS AND FLOODS.

During June the general tendency of all streams, except the extreme upper Mississippi and central Missouri, was to lower levels, and at intervals navigation on the rivers of South Carolina, Georgia, and Alabama, and on the Ohio and Cumberland rivers was seriously interrupted. Good navigable stages, however, were maintained on the Mississippi, Missouri, Arkansas, and Red rivers.

Heavy and in some instances excessive precipitation from the 2d to the 4th over the watersheds of the extreme upper Mississippi and the St. Croix rivers caused a rapid and decided rise of the rivers in that vicinity, and some apprehension was felt by squatters in the lowlands. There is no steamboating in that section; there is, however, considerable logging carried on, and the latter interest is reported as having sustained considerable damage. Sawmills were shut down and bottoms overflowed, the latter resulting in slight damage to crops. A moderate flood also occurred in the Kansas City river district, but no material damage was done.

The highest and lowest water, mean stage, and monthly range at 118 river stations are given in the accompanying table. Hydrographs for typical points on seven principal rivers are shown on Chart V. The stations selected for charting are: Keokuk, St. Louis, Cairo, Memphis, and Vicksburg, on the Mississippi; Cincinnati, on the Ohio; Nashville, on the Cumberland; Johnsonville, on the Tennessee; Kansas City, on the Missouri; Little Rock, on the Arkansas; and Shreveport, on the Red.

For fuller details see Monthly Bulletin of the River and Flood Service for June, 1898.—*F. W. Krichelt.*

Heights of rivers referred to zeros of gauges, June, 1898.

Stations.	Distance to mouth of river.	Danger line on gauge.	Highest water.		Lowest water.		Mean stage.	Monthly range.
			Height.	Date.	Height.	Date.		
Mississippi River.	*Miles.*	*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*
St. Paul, Minn	1,957	14	10.7	8,9	4.7	30	7.3	6.0
Reeds Landing, Minn	1,887	12	9.0	11	4.2	30	6.4	4.8
La Crosse, Wis	1,822	10	9.9	15	5.0	1	7.6	4.9
North McGregor, Iowa	1,762	18	10.0	19,20	4.6	1	6.8	5.4
Dubuque, Iowa	1,702	15	9.4	21-23	4.5	1-3	6.9	4.9
Leclaire, Iowa	1,612	10	6.0	24-27	3.1	2-5	4.5	2.9
Davenport, Iowa	1,596	15	7.4	24-26	4.0	1-6	5.5	3.4
Galland, Iowa	1,475	8	4.4	27	2.2	8	3.2	2.2
Keokuk, Iowa	1,466	14	7.9	27	3.3	9	5.6	4.6
Hannibal, Mo	1,405	17	9.3	28	4.9	8	7.0	4.4
Grafton, Ill	1,307	23	13.8	18	10.3	9,10	11.6	3.5
St. Louis, Mo	1,264	30	25.4	18	18.7	26	21.3	5.7
Chester, Ill	1,189	30	20.0	18,19	14.7	26	16.8	5.3
Cairo, Ill	1,073	40	30.9	1	21.8	26	25.0	9.1
Memphis, Tenn	843	33	24.9	1	15.6	15,29	18.7	9.3
Helena, Ark	767	44	36.0	1	23.2	30	28.0	12.8
Arkansas City, Ark	635	42	42.8	1	27.1	30	33.5	15.7
Greenville, Miss	595	40	36.8	1	22.6	30	28.3	14.2
Vicksburg, Miss	474	41	42.0	1-3	27.8	30	34.2	14.2
New Orleans, La	108	16	14.9	2,3	10.2	23	12.9	4.7
Arkansas River.								
Wichita, Kans	720	10	5.6	10	2.3	7	3.9	3.3
Fort Smith, Ark	345	22	13.8	16	6.7	3	9.3	7.1
Dardanelle, Ark	250	21	14.0	18	7.5	4	10.0	6.5
Little Rock, Ark	170	23	15.3	19	9.8	6	11.6	5.5
White River.								
Newport, Ark	150	26	14.5	1	6.1	28,29	7.9	8.4
Des Moines River.								
Des Moines, Iowa	150	19	8.6	11	3.7	30	4.7	4.9
Illinois River.								
Peoria, Ill	135	14	13.5	1	8.8	26	10.8	4.7
Missouri River.								
Bismarck, N. Dak	1,201	14	12.6	26	9.0	14,15	10.5	3.6
Pierre, S. Dak	1,006	14	11.2	28	8.2	1	9.4	3.0
Sioux City, Iowa	676	19	14.7	30	12.1	19,20	13.2	2.6
Omaha, Nebr	561	18	14.0	30	11.9	20,21	12.8	2.1
St. Joseph, Mo	373	10	10.1	10,11	7.6	1	8.8	2.5
Kansas City, Mo	280	21	21.5	12	16.6	24,25	18.7	4.9
Boonville, Mo	191	20	19.3	15	13.6	25	16.6	5.7
Hermann, Mo	95	24	18.8	17	13.4	25	15.9	5.4
Ohio River.								
Pittsburg, Pa	966	22	6.9	15	2.9	17	5.3	4.0
Davis Island Dam, Pa	950	25	6.7	15	3.2	12,29	4.5	3.5
Wheeling, W. Va	875	36	9.9	20	3.4	12	5.6	6.5
Parkersburg, W. Va	785	35	9.5	21	5.2	10	7.1	4.3
Point Pleasant, W. Va	703	36	9.3	1	3.4	12	5.9	5.9
Catlettsburg, Ky	651	50	13.0	1	4.4	13	8.2	8.6
Portsmouth, Ohio	612	50	14.5	1	6.0	14	9.4	8.5
Cincinnati, Ohio	499	45	18.8	1	8.1	15,16	11.7	10.7
Louisville, Ky	367	24	8.6	1	4.6	17	6.3	4.0
Evansville, Ind	184	30	18.6	1	6.4	18	10.1	12.2
Paducah, Ky	47	40	19.8	1	8.6	14	12.2	11.2
Allegheny River.								
Warren, Pa	177	7	5.0	28	0.9	{17-20, 26,27}	1.4	4.1
Oil City, Pa	123	13	3.8	30	1.2	9-12	1.8	2.6
Parkers Landing, Pa	73	20	4.5	29	1.0	8,9,12	1.8	3.5
Freeport, Pa	26	20	6.4	30	2.1	11,29	3.4	4.3
Conemaugh River.								
Johnstown, Pa	64	7	2.2	14	1.4	7-9	1.7	0.8
Red Bank Creek.								
Brookville, Pa	35	8	2.1	14	0.1	8-12	0.9	2.0
Beaver River.								
Ellwood Junction, Pa	10	14	5.0	19	—0.3	10-12	0.7	5.3
Cumberland River.								
Burnside, Ky	434	50	3.8	19	0.7	14	2.0	3.1
Carthage, Tenn	257	30	3.4	1,22	1.5	14	2.3	1.9
Nashville, Tenn	175	40	7.5	1	2.1	15	3.5	5.4
Great Kanawha River.								
Charleston, W. Va	61	30	7.6	20	4.4	2	6.5	3.2
New River.								
Hinton, W. Va	95	14	3.4	19,20	1.3	9-14,29,30	1.8	2.1
Licking River.								
Falmouth, Ky	30	25	4.5	29	1.0	18	1.9	3.5
Miami River.								
Dayton, Ohio	69	18	2.4	14	1.2	30	1.7	1.2
Monongahela River.								
Weston, W. Va	161	18	1.5	17	— 0.6	24-26	—0.4	2.1
Fairmont, W. Va	119	25	2.2	14	— 0.3	9,10	0.5	2.5
Greensboro, Pa	81	18	8.1	21	6.5	28	7.2	1.6
Lock No. 4, Pa	40	28	7.9	15	5.9	10,11	6.6	2.0
Cheat River.								
Rowlesburg, W. Va	36	14	3.5	21	1.8	8-13	2.2	1.7
Youghiogheny River.								
Confluence, Pa	59	10	3.9	14	1.0	10,11	1.8	2.9
West Newton, Pa	15	23	2.0	15	0.4	28-30	0.8	1.6
Muskingum River.								
Zanesville, Ohio	70	20	9.8	16	6.5	24-28	7.4	3.3

Heights of rivers above zeros of gauges—Continued.

Stations.	Distance to mouth of river.	Danger line on gauge.	Highest water.		Lowest water.		Mean stage.	Monthly range.
			Height	Date.	Height.	Date.		
Tennessee River.	*Miles.*	*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*
Knoxville, Tenn.	614	29	.....	.....	.....	.....	.....	.....
Kingston, Tenn.	534	25	3.3	21,22	0.2	14-16	1.4	2.1
Chattanooga, Tenn.	430	33	5.6	22	1.6	15	2.9	4.0
Bridgeport, Ala.	390	24	4.6	23	0.6	12,15,16	1.6	4.0
Florence, Ala.	220	16	3.8	25	0.5	14	1.4	3.3
Johnsonville, Tenn.	94	21	4.3	2	1.4	16	2.7	2.9
Clinch River.								
Speers Ferry, Va	156	20	5.9	19	0.3	{6,7,9,10/ 13,16}	1.1	5.6
Clinton, Tenn.	46	25	11.5	21	3.4	15	5.2	8.1
Wabash River.								
Mount Carmel, Ill.	50	15	15.0	1	3.0	30	6.3	12.0
Red River.								
Arthur City, Tex	688	27	12.5	16	5.6	2	8.9	6.9
Fulton, Ark.	505	28	18.5	18	9.0	5,6,13	12.3	9.5
Shreveport, La	449	29	14.1	1	9.1	15	11.5	5.0
Alexandria, La	139	33	14.1	3	8.4	18	11.3	5.7
Atchafalaya Bayou.								
Melville, La.	100*	31	32.0	1-3	26.6	30	29.7	5.4
Ouachita River.								
Camden, Ark	340	39	12.0	20	5.8	30	8.0	6.2
Monroe, La	100	40	19.4	1	12.2	15	14.9	7.2
Yazoo River.								
Yazoo City, Miss.	80	25	17.4	2	4.0	30	10.3	13.4
Chattahoochee River.								
Columbus, Ga.	140	20	5.0	22	−0.4	1-3	0.5	5.4
Flint River.								
Albany, Ga	80	20	3.6	30	0.5	7-10	1.5	3.1
Cape Fear River.								
Fayetteville, N. C.	100	38	7.0	21,22	1.1	9,12	2.8	5.9
Columbia River.								
Umatilla, Oreg	270	25	21.8	17,18	19.2	30	20.7	2.6
The Dalles, Oreg	166	40	36.9	20,21	32.2	10	34.8	4.7
Willamette River.								
Albany, Oreg	99	20	4.5	2,3	2.0	27-30	3.0	2.5
Portland, Oreg	10	15	20.7	19,21,22	18.5	9,10,30	19.6	2.2
Edisto River.								
Edisto, S. C.	75	6	3.0	25-27	0.4	13-16	1.5	2.6
James River.								
Lynchburg, Va	257	18	1.3	1,30,21	0.4	{10,11,/ 28,30}	0.8	0.9
Richmond, Va	110	12	0.9	6	0.0	29,30	0.4	0.9

Heights of rivers referred to zeros of gauges—Continued.

Stations.	Distance to mouth of river.	Danger line on gauge.	Highest water.		Lowest water.		Mean stage.	Monthly range.
			Height.	Date.	Height.	Date.		
Alabama River.	*Miles.*	*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*
Montgomery, Ala.	265	35	1.5	24	−0.8	13	0.2	2.3
Selma, Ala.	212	35	1.4	27	−1.3	12,14,15	−0.2	2.7
Coosa River.								
Rome, Ga	225	30	3.6	20	1.2	12	1.8	2.4
Gadsden, Ala	144	18	2.1	23	−0.1	16	0.5	2.2
Tombigbee River.								
Columbus, Miss.	285	33	1.7	17	−3.1	13	−1.8	4.8
Demopolis, Ala	155	35	1.8	20	−1.5	14	0.0	2.3
Black Warrior River.								
Tuscaloosa, Ala	90	38	1.3	27	−0.7	13	00.0	2.0
Pedee River.								
Cheraw, S. C.	145	27	4.8	20	0.8	12-14	1.0	4.0
Black River.								
Kingstree, S. C.	60	12	6.8	30	0.2	18	2.3	6.6
Lumber River.								
Fairbluff, N. C.	10	6	1.0	28	−0.9	13-18	−0.1	1.9
Lynch Creek.								
Effingham, S. C.	35	12	6.4	23	1.7	15,16	3.1	4.7
Potomac River.								
Harpers Ferry, W. Va.	170	16	2.9	1	1.2	29,30	1.7	1.7
Roanoke River.								
Clarksville, Va.	155	12	3.6	19	0.3	10-12	1.1	3.3
Sacramento River.								
Red Bluff, Cal.	241	23	1.0	1	0.1	26-30	0.4	0.9
Sacramento, Cal.	70	25	13.3	4	9.0	30	10.9	4.3
Santee River.								
St. Stephens, S. C.	50	12	6.6	24	−2.0	15,16	1.2	8.6
Congaree River.								
Columbia, S. C.	37	15	2.2	20	1.0	11-13,15	1.5	1.2
Wateree River.								
Camden, S. C.	45	24	10.5	18	1.4	13,14	3.4	9.1
Savannah River.								
Augusta, Ga.	130	32	9.7	21	4.0	11,30	5.1	5.7
Susquehanna River.								
Wilkesbarre, Pa.	178	14	3.0	12	0.0	{11-13, 19-22, 27-30}	1.0	1.2
Harrisburg, Pa.	70	17	4.3	1	1.7	30	2.6	2.6
Juniata River.								
Huntingdon, Pa.	80	24	4.1	1	2.9	30	3.4	1.2
W. Br. of Susquehanna.								
Williamsport, Pa.	35	20	3.5	1	1.0	2.8	2.0	2.5
Waccamaw River.								
Conway, S. C.	40	7	2.8	9	0.1	16	1.4	2.7

*Distance to Gulf of Mexico.

THE WEATHER OF THE MONTH.

By A. J. HENRY, Chief of Division of Records and Meteorological Data.

The statistical aspects of the weather of the month are presented in the tables which form the closing part of this REVIEW. Table I, in particular, contains numerous details that are important in the study of climatology. The numerical values in the tables have been generalized in a number of cases, the results appearing on Charts Nos. III to VIII, inclusive.

PRESSURE AND WIND.

Normal conditions.—The geographic distribution of normal barometric readings at sea level and under local gravity for June is shown by Chart V of the MONTHLY WEATHER REVIEW for June, 1893.

Normal pressure in June is highest over the south Atlantic and north Pacific coasts and lowest over Arizona and the Plateau region. As compared with May, it is the same or slightly less in all districts, except the south Atlantic coast, where there is a slight increase, amounting to about 0.02 inch on the average.

The prevailing winds, except on the Pacific coast, are generally from a southerly quarter—southwesterly in New England and the lower Lake region, southerly in the Mississippi Valley, the south Atlantic and Gulf coasts, and southeasterly on the Plains. On the Pacific coast the general tendency is to blow from some westerly quarter.

The current month.—The distribution of monthly mean pressure, as shown by Chart IV, is closely in accord with normal conditions. Pressure was almost normal in the majority of districts, the greatest plus departures occurring in North Dakota and Manitoba and over a narrow strip of the Rocky Mountain region, extending from Denver to Helena. Pressure was below normal over Arizona, Nevada, California, Oregon, and part of Washington.

The changes from May to June were rather large, there being an increase of from 0.05 to 0.08 inch over the territory bordering the Atlantic from Connecticut southward, and extending inland to the Ohio Valley and the lower Lakes. There was a corresponding decrease over the upper Missouri Valley and the Northwest, amounting to 0.12 inch at Williston and 0.06 inch at Denver. Pressure also fell 0.05 inch and over in California from Sacramento southward.

The prevailing winds on the Atlantic coast were almost without exception from seaward or parallel with the coast line. Some distance inland they became southwesterly, shifting to westerly in the lower Lake region. On the upper Lakes the prevailing direction was in some cases from the northwest and in others from the east and southeast.

In the Mississippi Valley and the Plains region the winds were generally southeasterly; in the upper Mississippi Valley from the north and northwest. The winds over the Rocky Mountain and Plateau regions were generally from a southerly quarter, and on the Pacific coast from the northwest and west.